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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/978,603	10/15/2001	Frank Kuo	AB-1170 US	5098

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EXAMINER	
MANDALA, VICTOR A	
ART UNIT	PAPER NUMBER
2826	

DATE MAILED: 07/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/978,603	KUO ET AL.	
	Examiner	Art Unit	
	Victor A Mandala Jr.	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 June 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 5-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 5-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. The Applicant argues that the prior art of record in Paper No. 10, U.S. Patent No.5,847,446 Park et al., does not teach the Applicant's claimed invention. The examiner has considered the arguments, but finds them to be non-persuasive because the independent claims teach the limitation that the slots are substantially outside where the die pad region is and does not teach that the slots do not extend underneath the die. Substantially means more than half or 50%, which makes the rejection over Park et al. valid. Park et al.'s Figure 5 defines the outer edge of the die #110 which is placed over the slots #124, but with regard to the slots that surround the corners of the die, the outer area of the slots which area not under the die have a larger unit area than the inner portion, thus being substantially outside the die pad region. The rejections in Paper No. 10 stands.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-2, and 5-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,847,446 Park et al. in view of U.S. Patent No. 5,844,306 Fujita et al.

1. Referring to claim 1, a die pad of a lead frame the die pad, (Park et al. Figure 5 #128), having four slots that penetrate the die pad, (Park et al. Figure 5 #128), to define a restrictive

region, (Park et al. Figure 5 #126), having four corners respectively corresponding to the slots, (Park et al. Figure 5 #124), such that each slot, (Park et al. Figure 5 #124), extends laterally around the corresponding corner substantially outside where the die pad, (Park et al. Figure 5 #128), receives a die and such that solder paste, (Fujita et al. Figure 5 #11 & Col. 2 Lines 66-67, Col. 3 Lines 1-6, & Col. 8 Lines 61), for connecting the die, (Park et al. Figure 5 #110), to the die pad, (Park et al. Figure 5 #128), is substantially restricted to the restrictive region, (Park et al. Figure 5 #126).

Park et al. teaches all of the claimed matter in claim 1, but does not teach a solder used to secure the die to the die pad. Park et al. teaches a sealing resin instead of a solder, but Fujita et al. does. Fujita et al. teaches all of the claimed matter in claim 1, but does not teach the slots to extend laterally around the die pad location. It would have been obvious to combine the teachings of Park et al. with the teachings of Fujita et al. because applying resin to the die pad when attaching the die allows the die to be secured, while the slots allow for excess solder to flow into which allow for no interference with the leads of the chip, (Fujita et al. & Col. 2 Lines 66-67 and Col. 3 Lines 1-6).

2. Referring to claim 2, a die pad of a lead frame, wherein the restrictive region, (Park et al. Figure 5 #126), and the die, (Park et al. Figure 5 #110), are of approximately identical lateral areas.

3. Referring to claim 5, a lead frame comprising a plurality, (See ** below), of die pads, (Park et al. Figure 5 #128), and a plurality of pins, (Park et al. Figure 5 #122), each die pad, (Park et al. Figure 5 #128), having four slots, (Park et al. Figure 5 #124), which penetrate that die pad, (Park et al. Figure 5 #128), to define a restrictive region, (Park et al. Figure 5 #126), having

four corners respectively corresponding to the slots, (Park et al. Figure 5 #124), such that each slot, (Park et al. Figure 5 #124), extends laterally around the corresponding corner substantially outside where that die pad, (Park et al. Figure 5 #128), receives a die, (Park et al. Figure 5 #110), and such that solder paste, (Fujita et al. Figure 5 #11 & Col. 2 Lines 66-67, Col. 3 Lines 1-6, & Col. 8 Lines 61), for connecting the die to that die pad, (Park et al. Figure 5 #128), is substantially restricted to the restrictive region, (Park et al. Figure 5 #126).

Park et al. teaches all of the claimed matter in claim 1, but does not teach a solder used to secure the die to the die pad. Park et al. teaches a sealing resin instead of a solder, but Fujita et al. does. Fujita et al. teaches all of the claimed matter in claim 1, but does not teach the slots to extend laterally around the die pad location. It would have been obvious to combine the teachings of Park et al. with the teachings of Fujita et al. because applying resin to the die pad when attaching the die allows the die to be secured, while the slots allow for excess solder to flow into which allow for no interference with the leads of the chip, (Fujita et al. & Col. 2 Lines 66-67 and Col. 3 Lines 1-6).

** Park et al. discloses the claimed invention except for the plurality of die pads, but Fujita et al. does in Col. 1 Lines 22-27. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a plurality of die pads, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. St. Regis Paper Co. v. Bemis Co. 1 93 USPQ8

4. Referring to claim 6, a lead frame, wherein each restrictive region, (Park et al. Figure 5 #126), and the die, (Park et al. Figure 5 #110), connected to that restrictive region, (Park et al. Figure 5 #126), are of approximately identical lateral areas.

5. Referring to claim 7, a structure comprising: a die, (Park et al. Figure 5 #110); a die pad, (Park et al. Figure 5 #128), of a lead frame, the die pad, (Park et al. Figure 5 #128), having four slots, (Park et al. Figure 5 #124), that penetrate the die pad, (Park et al. Figure 5 #128), to define a restrictive region, (Park et al. Figure 5 #126), having four corners respectively corresponding to the slots, (Park et al. Figure 5 #124), the die, (Park et al. Figure 5 #110), connected to the die pad, (Park et al. Figure 5 #128), substantially within the restrictive region, (Park et al. Figure 5 #126), each slot, (Park et al. Figure 5 #124), extending laterally around the corresponding corner substantially outside where the die pad, (Park et al. Figure 5 #128), receives the die, (Park et al. Figure 5 #110); and solder paste, (Fujita et al. Figure 5 #11 & Col. 2 Lines 66-67, Col. 3 Lines 1-6, & Col. 8 Lines 61), for connecting the die, (Park et al. Figure 5 #110), to the die pad, (Park et al. Figure 5 #128), such that the solder paste, (Fujita et al. Figure 5 #11 & Col. 2 Lines 66-67, Col. 3 Lines 1-6, & Col. 8 Lines 61), is restricted to the restrictive region, (Park et al. Figure 5 #126).

Park et al. teaches all of the claimed matter in claim 1, but does not teach a solder used to secure the die to the die pad. Park et al. teaches a sealing resin instead of a solder, but Fujita et al. does. Fujita et al. teaches all of the claimed matter in claim 1, but does not teach the slots to extend laterally around the die pad location. It would have been obvious to combine the teachings of Park et al. with the teachings of Fujita et al. because applying resin to the die pad when attaching the die allows the die to be secured, while the slots allow for excess solder to flow into which allow for no interference with the leads of the chip, (Fujita et al. & Col. 2 Lines 66-67 and Col. 3 Lines 1-6).

6. Referring to claim 8, a structure, wherein the restrictive region, (Park et al. Figure 5 #126), and the die, (Park et al. Figure 5 #110), are of approximately identical lateral areas.

7. Referring to claim 9, a die pad, (Park et al. Figure 5 #128), having: a die location for receiving a die, (Park et al. Figure 5 #110), the die location laterally matching the die, (Park et al. Figure 5 #110), and having four corners; and a plurality of slots, (Park et al. Figure 5 #124), that penetrate the die pad, (Park et al. Figure 5 #128), to define a restrictive region, (Park et al. Figure 5 #126), such that solder paste, (Fujita et al. Figure 5 #11 & Col. 2 Lines 66-67, Col. 3 Lines 1-6, & Col. 8 Lines 61), for connecting the die to the die pad, (Park et al. Figure 5 #128), substantially within the restrictive region, (Park et al. Figure 5 #126), is substantially restricted to the restrictive region, (Park et al. Figure 5 #126), one of the slots, (Park et al. Figure 5 #124), extending around one of the corners of the die location substantially outside the die location. Park et al. teaches all of the claimed matter in claim 1, but does not teach a solder used to secure the die to the die pad. Park et al. teaches a sealing resin instead of a solder, but Fujita et al. does. Fujita et al. teaches all of the claimed matter in claim 1, but does not teach the slots to extend laterally around the die pad location. It would have been obvious to combine the teachings of Park et al. with the teachings of Fujita et al. because applying resin to the die pad when attaching the die allows the die to be secured, while the slots allow for excess solder to flow into which allow for no interference with the leads of the chip, (Fujita et al. & Col. 2 Lines 66-67 and Col. 3 Lines 1-6).

8. Referring to claim 10, a die pad, (Park et al. Figure 5 #128), wherein another of the slots, (Park et al. Figure 5 #124), extends around another of the corners of the die, (Park et al. Figure 5 #110), location substantially outside the die location.

9. Referring to claim 11, a lead frame comprising, a plurality, (See ** below), of die pads, (Park et al. Figure 5 #128), and a plurality of pins, (Park et al. Figure 5 #122), each die pad, (Park et al. Figure 5 #128), having: a die location for receiving a die, (Park et al. Figure 5 #110), the die location laterally matching the die, (Park et al. Figure 5 #110), and having four corners; and a plurality of slots, (Park et al. Figure 5 #124), that penetrate that die pad, (Park et al. Figure 5 #128), to define a restrictive region, (Park et al. Figure 5 #126), such that solder paste, (Fujita et al. Figure 5 #11 & Col. 2 Lines 66-67, Col. 3 Lines 1-6, & Col. 8 Lines 61), for connecting the die, (Park et al. Figure 5 #110), to that die pad, (Park et al. Figure 5 #128), substantially within the restrictive region, (Park et al. Figure 5 #126), is substantially restricted to the restrictive region, (Park et al. Figure 5 #126), one of the slots, (Park et al. Figure 5 #124), extending laterally around one of the corners of the die location substantially outside the die location. Park et al. teaches all of the claimed matter in claim 1, but does not teach a solder used to secure the die to the die pad. Park et al. teaches a sealing resin instead of a solder, but Fujita et al. does. Fujita et al. teaches all of the claimed matter in claim 1, but does not teach the slots to extend laterally around the die pad location. It would have been obvious to combine the teachings of Park et al. with the teachings of Fujita et al. because applying resin to the die pad when attaching the die allows the die to be secured, while the slots allow for excess solder to flow into which allow for no interference with the leads of the chip, (Fujita et al. & Col. 2 Lines 66-67 and Col. 3 Lines 1-6).

** Park et al. discloses the claimed invention except for the plurality of die pads, but Fujita et al. does in Col. 1 Lines 22-27. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a plurality of die pads, since it has been held that

mere duplication of the essential working parts of a device involves only routine skill in the art. St. Regis Paper Co. v. Bemis Co. 1 93 USPQ8

10. Referring to claim 12, a lead frame, wherein another of the slots, (Park et al. Figure 5 #124), in each die pad, (Park et al. Figure 5 #128), extends around another of the corners of that die pad's, (Park et al. Figure 5 #128), die location substantially outside that die pad's, (Park et al. Figure 5 #128), die location.

11. Referring to claim 13, a structure comprising: a die, (Park et al. Figure 5 #110); a die pad, (Park et al. Figure 5 #128), having (a) a die location for receiving the die, (Park et al. Figure 5 #110), the die location matching the die, (Park et al. Figure 5 #110), and having four corners, and (b) a plurality of slots, (Park et al. Figure 5 #124), the penetrate the die pad, (Park et al. Figure 5 #128), to define a restrictive region, (Park et al. Figure 5 #126), one of the slots, (Park et al. Figure 5 #124), extending laterally around one of the corners of the die location substantially outside the die location; and solder paste, (Fujita et al. Figure 5 #11 & Col. 2 Lines 66-67, Col. 3 Lines 1-6, & Col. 8 Lines 61), for connecting the die, (Park et al. Figure 5 #110), to the die pad, (Park et al. Figure 5 #128), substantially within the restrictive region, (Park et al. Figure 5 #126), such that the solder paste, (Fujita et al. Figure 5 #11 & Col. 2 Lines 66-67, Col. 3 Lines 1-6, & Col. 8 Lines 61), is substantially restricted to the restrictive region, (Park et al. Figure 5 #126). Park et al. teaches all of the claimed matter in claim 1, but does not teach a solder used to secure the die to the die pad. Park et al. teaches a sealing resin instead of a solder, but Fujita et al. does. Fujita et al. teaches all of the claimed matter in claim 1, but does not teach the slots to extend laterally around the die pad location. It would have been obvious to combine the teachings of Park et al. with the teachings of Fujita et al. because applying resin to the die pad when attaching

the die allows the die to be secured, while the slots allow for excess solder to flow into which allow for no interference with the leads of the chip, (Fujita et al. & Col. 2 Lines 66-67 and Col. 3 Lines 1-6).

12. Referring to claim 14, a structure, wherein another of the slots, (Park et al. Figure 5 #124), extends around another of the corners of the die, (Park et al. Figure 5 #110), location substantial outside the die location.

13. Referring to claim 15, a structure, wherein the two corners around which two of the slots, (Park et al. Figure 5 #124), respectively extend are adjacent corners of the die, (Park et al. Figure 5 #110), location.

14. Referring to claim 16, a structure, wherein the two corners around which two of the slots, (Park et al. Figure 5 #124), respectively extend are opposite corners of the die, (Park et al. Figure 5 #110), location.

15. Referring to claim 17, a method comprising: providing a die pad, (Park et al. Figure 5 #128), of a lead frame with four slots, (Park et al. Figure 5 #124), that penetrate the die pad, (Park et al. Figure 5 #128), to define a restrictive region, (Park et al. Figure 5 #126), having four corners respectively corresponding to the slots, (Park et al. Figure 5 #124), and providing solder paste between the restrictive region, (Park et al. Figure 5 #126), and a die, (Park et al. Figure 5 #110), for connecting the die, (Park et al. Figure 5 #110), to the die pad, (Park et al. Figure 5 #128), such that each slot, (Park et al. Figure 5 #124), extends laterally around the corresponding corner substantially outside where the die pad, (Park et al. Figure 5 #128), receives the die, (Park et al. Figure 5 #110), and such that the solder paste, (Fujita et al. Figure 5 #11 & Col. 2 Lines 66-

67, Col. 3 Lines 1-6, & Col. 8 Lines 61), is substantially restricted to the restrictive region, (Park et al. Figure 5 #126).

Park et al. teaches all of the claimed matter in claim 1, but does not teach a solder used to secure the die to the die pad. Park et al. teaches a sealing resin instead of a solder, but Fujita et al. does. Fujita et al. teaches all of the claimed matter in claim 1, but does not teach the slots to extend laterally around the die pad location. It would have been obvious to combine the teachings of Park et al. with the teachings of Fujita et al. because applying resin to the die pad when attaching the die allows the die to be secured, while the slots allow for excess solder to flow into which allow for no interference with the leads of the chip, (Fujita et al. & Col. 2 Lines 66-67 and Col. 3 Lines 1-6).

16. Referring to claim 18, a method, wherein the restrictive region, (Park et al. Figure 5 #126), and the die, (Park et al. Figure 5 #110), are of approximately identical lateral areas.

17. Referring to claim 19, a method comprising: providing a die pad, (Park et al. Figure 5 #128), with a plurality of slots, (Park et al. Figure 5 #124), that penetrate the die pad, (Park et al. Figure 5 #128), to define a restrictive region, (Park et al. Figure 5 #126); and providing solder paste between the restrictive region, (Park et al. Figure 5 #126), and a die, (Park et al. Figure 5 #110), for connecting the die, (Park et al. Figure 5 #110), to the die pad, (Park et al. Figure 5 #128), at a die location substantially within the restrictive region, (Park et al. Figure 5 #126), such that the die location laterally matches the die, (Park et al. Figure 5 #110), and has four corners, such that one of the slots, (Park et al. Figure 5 #124), extends laterally around one of the corners of the die location substantially outside the die location, and such that the solder paste,

(Fujita et al. Figure 5 #11 & Col. 2 Lines 66-67, Col. 3 Lines 1-6, & Col. 8 Lines 61), is substantially restricted to the restrictive region, (Park et al. Figure 5 #126).

Park et al. teaches all of the claimed matter in claim 1, but does not teach a solder used to secure the die to the die pad. Park et al. teaches a sealing resin instead of a solder, but Fujita et al. does. Fujita et al. teaches all of the claimed matter in claim 1, but does not teach the slots to extend laterally around the die pad location. It would have been obvious to combine the teachings of Park et al. with the teachings of Fujita et al. because applying resin to the die pad when attaching the die allows the die to be secured, while the slots allow for excess solder to flow into which allow for no interference with the leads of the chip, (Fujita et al. & Col. 2 Lines 66-67 and Col. 3 Lines 1-6).

18. Referring to claim 20, a method, wherein another of the slots, (Park et al. Figure 5 #124), extends around another of the corners of the die, (Park et al. Figure 5 #110), location substantially outside the die location.

19. Referring to claim 21, a method, wherein the two corners around which two of the slots, (Park et al. Figure 5 #124), respectively extend are adjacent corners of the die, (Park et al. Figure 5 #110), location.

20. Referring to claim 22, a method, wherein the two corners around which two of the slots, (Park et al. Figure 5 #124), respectively extend are opposite corners of the die, (Park et al. Figure 5 #110), location.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor A Mandala Jr. whose telephone number is (703) 308-6560. The examiner can normally be reached on Monday through Thursday from 8am till 6pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (703) 308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

VAMJ

July 14, 2003

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